

WHAT WE CLAIM IS:

1. A gas diffusion electrode assembly comprising a plurality of gas diffusion electrodes, characterized in that a bonding piece having on at least one surface a
5 perfluorosulfonic acid layer, a perfluorosulfonyl fluoride layer or an alky ester of perfluorocarboxylic acid layer is placed at said perfluoro compound layer surface with respect to adjacent gas diffusion electrodes to bond said adjacent gas diffusion electrodes together by heat fusion
10 bonding.

2. A bonding method for a gas diffusion electrode assembly comprising a plurality of gas diffusion electrodes, characterized in that a bonding piece having on at least one surface a perfluorosulfonic acid layer, a
15 perfluorosulfonyl fluoride layer or an alky ester of perfluorocarboxylic acid layer is placed at said perfluoro compound layer surface with respect to both adjacent gas diffusion electrodes to bond the respective gas diffusion electrodes to said bonding piece by heat fusion bonding.

20 3. A bonding method for a gas diffusion electrode assembly, characterized in that a covering sheet is covered on a junction where gas diffusion electrodes are bonded together, and an adhesive composition containing a corrosion-resistant synthetic resin is coated on said
25 covering sheet for bonding.

4. The bonding method for a gas diffusion electrode assembly according to claim 3, characterized in that either one of the surface of said junction to be

bonded to said covering sheet and the surface of said covering sheet to be bonded to said junction is previously impregnated with a corrosion-resistant synthetic resin containing solution having a synthetic resin concentration lower than that of said adhesive composition containing a corrosion-resistant synthetic resin.

5 5. The bonding method for a gas diffusion electrode assembly according to claim 3, characterized in that a filling agent is filled in a gap formed between
10 said gas diffusion electrodes and said covering sheet.

6. The bonding method for a gas diffusion electrode assembly according to claim 3, characterized in that said covering sheet is microporous on at least the surface thereof.

15 7. The bonding method for a gas diffusion electrode assembly according to claim 3, characterized in that said corrosion-resistant synthetic resin is a homopolymer or copolymer of tetrafluoroethylene.

20 8. An electrolyzer comprising a gas diffusion electrode assembly, characterized in that a periphery of an electrode surface opposite to the opposite polarity side of said gas diffusion electrode assembly is airtightly bonded to a frame form of bonding member, a surface of a junction of at least a bonding frame of said
25 frame form of bonding member with said gas diffusion electrode assembly is provided with a perfluorosulfonic acid layer, a perfluorosulfonyl fluoride layer or an alkyl ester of perfluorocarboxylic acid layer, and a periphery

of said frame form of bonding member is stacked thereon via a gasket.

9. The electrolyzer comprising a gas diffusion electrode assembly according to claim 8, characterized in
5 that said frame form of bonding member is provided with a plurality of bonding frame blocks, to each of which a gas diffusion electrode is bonded.

10. The electrolyzer comprising a gas diffusion electrode assembly according to claim 9, characterized in
10 that said frame form of bonding member is formed in a seamless, integral manner.

11. A sealing method for a gas diffusion electrode assembly, characterized in that a sealing material containing an electrically conductive carbonaceous
15 material and a fluoro-resin is filled in a junction of gas diffusion electrodes, so that said sealing material is heat treated for bonding.

12. The sealing method for a gas diffusion electrode assembly according to claim 11, characterized in
20 that at said junction of gas diffusion electrodes, a collector is exposed on a periphery thereof.

13. The sealing method for a gas diffusion electrode assembly according to claim 11, characterized in
that said sealing material is composed of the same
25 constituent as the constituent of either one of a gas supply layer or a reactive layer of the gas diffusion electrodes to be bonded together.

14. The sealing method for a gas diffusion

electrode assembly according to claim 11, characterized in that said sealing material contains a catalyst substance in a gas diffusion electrode.

15. The sealing method for a gas diffusion
5 electrode assembly according to claim 11, characterized in that the junction of a gas diffusion electrode is a junction of said gas diffusion electrode with a cathode chamber collector frame, and a gap between said gas diffusion electrode and said cathode chamber collector
10 frame is sealed up.

16. The sealing method for a gas diffusion
electrode assembly according to claim 11, characterized in that the junction of a gas diffusion electrode is a
junction of said gas diffusion electrode with an adjacent
15 gas diffusion electrode thereto, and a gap between adjacent gas diffusion electrodes is sealed up.

17. A repairing method for a gas diffusion
electrode, characterized in that a sealing material containing an electrically conductive carbonaceous
20 material and a fluoro-resin is filled in a defective portion of said gas diffusion electrode, so that said defective portion is repaired by heat treatment of said sealing material.